

1 centrally disposed radiant burner that uniformly
2 radiates in a 360 degree arc. The radiant burner
3 transfers radiant energy to the surface of the outer
4 conduits 131.

5 Combustion gases exiting the radiant burner
6 107 are introduced into a convection chamber 117 that
7 is concentrically disposed around a portion of the
8 outer conduit 131 in the proximity of the tubular
9 conduit end containing the reactant gas inlet means
10 112. After transferring heat by convection to the
11 outer conduit, the combustion gases exit at an outlet
12 means 111.

13 Accordingly, the Fig. 5 embodiment includes:

14 a) a straight tubular outer conduit
15 concentrically disposed around an inner conduit to form
16 a reaction chamber containing catalyst in the annular
17 space between the outer conduit wall and the inner
18 conduit wall, for conversion of hydrocarbon to
19 industrial gases by reaction with steam, and an inner
20 conduit defined space for the return flow of reactant
21 gases to an exit means; said tubular reaction chamber
22 having one end that extends into the combustion chamber
23 and an opposite end that extends outside of the
24 combustion chamber, and there being inlet means that is
25 in communication with the annular space and an exit

1 means that is in communication with the inner conduit
2 defined space,
3 b) and a radiant burner vertically disposed
4 within said combustion chamber and having a gas
5 permeable zone that promotes the flameless combustion
6 of fuel and oxidant supplied to said burner in order to
7 heat the metal fiber surface of the burner to
8 incandescence for radiating heat energy to the reaction
9 chamber.

10 Also, there is typically a convection chamber
11 extending about a portion of the tubular reaction
12 chamber in the proximity of the end containing the
13 reactant gas inlet and outlet means to enhance heat
14 transfer from combustion products; said convection
15 chamber having an inlet means that is in communication
16 with the combustion chamber and an exit means for
17 combustion products that is outside the combustion
18 chamber.

19 The structure may be alternatively considered
20 to represent a multiplicity of said tubular reaction
21 chambers are provided and are concentrically disposed
22 around a centrally located and vertically disposed
23 cylindrical radiant burner having a 360 degree radiant
24 arc.

1 It should be apparent to those skilled in the
2 art that the subject invention accomplishes the objects
3 set forth above.

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